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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,887	03/31/2004	Katsufumi Ehata	251241US2	4589

22850 7590 08/25/2005

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EXAMINER	
NATALINI, JEFF WILLIAM	

ART UNIT	PAPER NUMBER
2858	

DATE MAILED: 08/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/812,887	EHATA, KATSUFUMI	
	Examiner	Art Unit	
	Jeff Natalini	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,11-15,24-33,37,38,40 and 41* is/are pending in the application.

4a) Of the above claim(s) *5-10,16-23,34-36 and 39* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,11-15,24-33,37,38,40 and 41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/30/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Election/Restrictions

1. Applicant's election with traverse of figure 4 claims 1-4, 11-15, 24-33, 37-38, 40, and 41 in the reply filed on 7/18/05 is acknowledged. The traversal is on the ground(s) that the search will not place a serious burden on the examiner. This is not found persuasive because the search for the distinct inventions lead in divergent ways, and a search for one group would not be the same as a different group. As the group also represent patentably distinct invention the restriction is proper.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 24, 25, and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Galwas et al. ("Dielectric Measurements Using a Coaxial ..."- IEEE).

In regard to claims 1 and 24, Galwas et al. discloses a method/apparatus for measuring a complex dielectric constant (permittivity) of a dielectric (abstract, introduction), comprising the steps of: filling a mode generator with a dielectric (abstract); inputting an electromagnetic wave to the mode generator; measuring an electromagnetic wave output from the mode generator, and calculating a complex

dielectric constant based on the electromagnetic wave thus measured (pg 511 col 1 – pg 512 col 2).

In regard to claim 25, Galwas et al. discloses wherein the mode generator is a resonator (fig 1) for filling the dielectric (abstract) and a gas (pg 513, part IV first paragraph explains and air filled layer is in the resonator) therein, the electromagnetic wave generating analyzer measures a resonance frequency, an insertion loss and a half-power width in a resonance mode of the electromagnetic wave, and the calculating device calculates the complex dielectric constant of the dielectric based on the resonance frequency, the insertion loss and the half-power width (abstract and pg 511 col 1 through pg 512 col 3).

In regard to claim 40, Galwas et al. discloses wherein a dielectric and the gas (pg 513 part IV first paragraph) are filled in a closed spaced in the resonator having an almost circular region (fig 1, and caption).

In regard to claim 41, Galwas et al. discloses wherein the mode generator is a waveguide filled with a mixture by mixing a powder of which the dielectric constant is to be measured (pg 514 col 1) with a gas (pg 513 part IV first paragraph) or liquid (pg 514 part V).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galwas et al. in view of De (4866371) and Hua et al. ("A Mixture Approach with Perturbation ..." IEEE).

In regard to claims 2-4, 11/2 and 12/2, Galwas et al. discloses wherein the dielectric is a powder (pg 514 col 1), calculates the dielectric constant from a mixture (pg 514 conclusion) with resonance frequency, insertion loss, and half-power width (abstract and pg 511 col 1 – pg 512 col 2).

Galwas et al. lacks wherein in determining the dielectric constant of the mixture is done based on the s-parameter and the calculation of the complex dielectric constant of the dielectric is determined from the dielectric constant of the mixture and a volume ratio of the dielectric in the mixture, wherein the calculation of the dielectric constant of the mixture is a value of the calculation of the dielectric constant of the mixture and vice versa for the dielectric, wherein the dielectric constant is used by using logarithmic alligation and Lichteneker-Rother equation (col 1 line 41-50).

De discloses wherein an S-parameter is determined in order to calculate the dielectric constant of the dielectric of the sample under test.

It would have been obvious to one with ordinary skill in the art at the time the invention was made to calculate the s-parameters of the transmission through the sample as disclosed by De in order to determine the real and imaginary parts of the dielectric constant.

Hua et al. discloses wherein the calculation of the complex dielectric constant of the dielectric from the dielectric constant of the mixture and a volume ratio of the dielectric in the mixture, wherein the calculation of the dielectric constant of the mixture is a value of the calculation of the dielectric constant of the mixture and vice versa for the dielectric (abstract, part I, and part II; pgs 501-502), wherein the dielectric constant is used by using logarithmic alligation and Lichteneker-Rother equation (part II; pg 501-502).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the apparatus disclosed by Galwas et al. to calculate the dielectric constant of the mixture and use a ratio to calculate the dielectric constant of the dielectric with a Lichtenecker equation as taught by Hua et al. in order to predict the variation of conductivity (abstract).

In regard to claims 11/2 and 12/2, Galwas discloses wherein the mode generator is a cylindrical cavity resonator (see fig 1 pg 511).

6. Claims 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galwas et al. in view of King (5334941).

In regard to claim 26, Galwas et al. discloses a first piston (fig 1 (top layer)); a second piston opposite the first piston (bottom layer); a cylinder for covering the first piston and the second piston forming a closed space (structure pointed to by 2b);

Galwas et al. lacks wherein there is a through hole in the first piston and a coaxial cable is inserted in the through whole for inputting and outputting the wave.

King discloses a through hole (fig 2 (hole that cable 7 is going through) in a resonator (11) with a coaxial cable (7) inserted for inputting and outputting the wave (17;abstract).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Galwas et al. to incorporate having a through hole in the first piston so that a coaxial cable is inserted to input and output the wave as taught by King in order to extend the connection through the resonator (col 11 line 3-10).

In regard to claim 27, Galwas et al. discloses where an annular groove is formed on a tip portion of the first piston and tip portion on the second piston (fig 1, there is a grove in the part that T1 (top) and T2 (bottom) are pointing to).

In regard to claim 28, Galwas et al. discloses where an annular conductor plate or dielectric plate is attached to the tip portion of the first piston and a tip portion of the second piston (fig 1-plate where T1 and T2 is pointing to).

7. Claims 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galwas et al. in view of Hua et al. ("A Mixture Approach with Perturbation ..." IEEE).

Galwas et al. discloses wherein the dielectric is a powder (pg 514 col 1), calculates the dielectric constant from a mixture (pg 514 conclusion) with resonance frequency, insertion loss, and half-power width (abstract and pg 511 col 1 – pg 512 col 2).

Galwas et al. lacks wherein the calculation of the complex dielectric constant of the dielectric from the dielectric constant of the mixture and a volume ratio of the

dielectric in the mixture, wherein the calculation of the dielectric constant of the mixture is a value of the calculation of the dielectric constant of the mixture and vice versa for the dielectric, wherein the dielectric constant is used by using logarithmic alligation and Lichteneker-Rother equation.

Hua et al. discloses wherein the calculation of the complex dielectric constant of the dielectric from the dielectric constant of the mixture and a volume ratio of the dielectric in the mixture, wherein the calculation of the dielectric constant of the mixture is a value of the calculation of the dielectric constant of the mixture and vice versa for the dielectric (abstract, part I, and part II; pgs 501-502), wherein the dielectric constant is used by using logarithmic alligation and Lichteneker-Rother equation (part II; pg 501-502).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the apparatus disclosed by Galwas et al. to calculate the dielectric constant of the mixture and use a ratio to calculate the dielectric constant of the dielectric with a Lichtenecker equation as taught by Hua et al. in order to predict the variation of conductivity (abstract).

8. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galwas et al. and Hua et al., as applied to claim 29 above, and further in view of Xi et al. ("Field Analysis of New Coaxial Dielectrometer" IEEE).

Galwas et al. and Hua et al. lacks wherein the calculation of the dielectric constant for both the mixture and dielectric is a calculation of a dielectric loss tangent, and where the calculation of loss tangent is done using an equation of alligation.

Xi et al. teaches that the dielectric loss tangent is taken into account when determining a dielectric constant using an equation of alligation (part IV; pg 1932 col 2 – pg 1933 col 2).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to include a calculation of the loss tangent by alligation in the dielectric constant as taught by Xi et al. in order to avoid any errors or miscalculations in the calculation (pg 1933).

9. Claims 14/1, 14/2, 15, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galwas et al. (14/2 is rejected also in view of De (4866371) and Hua et al. as applied to claim 2, and further) in view of Tomiyasu (2867781).

Galwas et al. lacks wherein a vacuum devices is used for evacuating a closed space in the resonator to dry the dielectric in the resonator.

Tomiyasu et al. discloses wherein the walls of the container (fig 1 (11))are dielectric and a vacuum (fig 1 (22)) evacuates the container of the gas, thus drying the dielectric walls (col 6 line 53-63).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Galwas et al. to incorporate evacuating the container of the gas

with a vacuum thus drying the dielectric in order to decontaminate the gas within the container (col 6 line 69-72).

10. Claims 37 and 13/2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galwas et al. (claim 13/2 is rejected also in view of De (4866371) and Hua et al. as applied to claim 2, and further) in view of Okawa (6656864).

Galwas et al. lacks specifically where in the resonance mode is a TE.sub.011 mode.

Okawa discloses wherein the resonance mode is a TE mode in a dielectric resonator (col 12 line 55-67).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to use a TE mode as taught by Okawa in order to have the microwave confined in the dielectric to cause resonance at a specific frequency.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Joshi (6617861) discloses and apparatus/method for monitoring complex permittivity (determining dielectric constant) of materials, uses a resonator and determines tangent loss of the dielectric sample which can be powder. Marrelli et al. (5625293) teaches determining dielectric constant from S-parameters. Hearn (5594351) discloses a resonator that operates on microwaves with an input/output hole for a source signal and a measurement device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Natalini whose telephone number is 571-272-2266. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lefkowitz can be reached on 571-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeff Natalini

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PRIMARY EXAMINER